

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Naomasa SHIRAISHI

Application No.: 10/679,151

Filed: October 6, 2003

Docket No.: 032136.09

For: PROJECTION EXPOSURE METHOD WITH LUMINOUS FLUX DISTRIBUTION (AS AMENDED)

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 CFR §1.56, the attention of the Patent and Trademark Office is hereby directed to the reference(s) listed on the attached PTO-1449. Unless otherwise indicated herein, one copy of each reference is attached. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the reference(s) be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

- ☒ 1. This Information Disclosure Statement is being filed (a) within three months of the U.S. filing date of this non-CPA application, OR (b) before the mailing date of a first Office Action on the merits in the present application. No certification or fee is required.
- ☒ 2. The references were cited by or submitted to the Office in parent application No. 09/423,457, filed April 19, 1995, which is relied upon for an earlier filing date under 35 U.S.C. §120. Thus, copies of these references are not attached. 37 CFR §1.98(d).

Respectfully submitted,

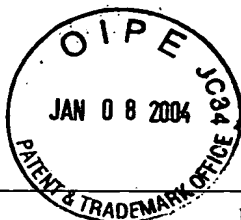
Mario A. Costantino
Registration No. 33,565

MAC/ccs
Date: January 8, 2004

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

**DEPOSIT ACCOUNT USE
AUTHORIZATION**

Please grant any extension
necessary for entry;
Charge any fee due to our
Deposit Account No. 15-0461

Sheet 1 of 9

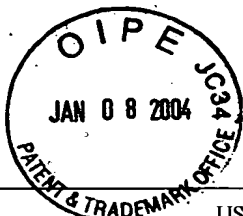
Form PTO-1449 (REV. 8-83)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 032136.09		APPLICATION NO. 10/679,151	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Naomasa SHIRAISHI			
				FILING DATE October 6, 2003		GROUP	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	
		4,179,708	12-1979	Sheng et al.			
		4,249,793	02-1981	Uehara			
		4,275,288	06-1981	Makosch et al.			
		4,370,034	01-1983	Nohda			
		4,389,701	06-1983	Phillips			
		4,476,519	10-1984	Hayamizu			
		4,497,013	01-1985	Ohta			
		4,498,742	02-1985	Uehara			
		4,547,037	10-1985	Case			
		4,566,765	01-1986	Miyauchi et al.			
		4,585,315	04-1986	Sincerbox et al.			
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	
		WO 88/08932	11-1988	WIPO			
		EP-A1-0 282 593	09-1988	Europe			
		EP-A2-0 346 844	12-1989	Europe			
		1,137,243	12-1968	United Kingdom			
		JP-A-1-295215	11-1989	Japan (with abstract)			
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
		IBM Technical Disclosure Bulletin, vol. 32, no. 1, "Extended Focal Depth Optical Microlithography", June 1989, pp. 125-127.					
EXAMINER				DATE CONSIDERED			
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

Date: January 8, 2004

Sheet 2 of 9

Form PTO-1449 (REV. 8-83)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 032136.09		APPLICATION NO. 10/679,151	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Naomasa SHIRAISHI			
				FILING DATE October 6, 2003		GROUP	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	
		4,637,691	01-1987	Uehara et al.			
		4,769,750	09-1988	Matsumoto et al.			
		4,851,882	07-1989	Takahashi et al.			
		4,851,978	07-1989	Ichihara			
		4,918,583	04-1990	Kudo et al.			
		4,497,015	01-1985	Konno et al.			
		4,619,508	10-1986	Shibuya et al.			
		4,668,077	05-1987	Tanaka			
		4,780,749	10-1988	Schulman			
		4,828,392	05-1989	Nomura et al.			
		4,853,756	08-1989	Matsuki			
		4,931,830	06-1990	Suwa et al.			
		4,939,630	07-1990	Kikuchi et al.			
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
EXAMINER					DATE CONSIDERED		
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

Date: January 8, 2004

Sheet 3 of 9Form PTO-1449
(REV. 8-83)US Dept. of Commerce
PATENT & TRADEMARK OFFICEATTY DOCKET NO.
032136.09APPLICATION NO.
10/679,151

INFORMATION DISCLOSURE STATEMENT

(Use several sheets if necessary)

APPLICANT(S)
Naomasa SHIRAISHIFILING DATE
October 6, 2003

GROUP

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
		4,952,815	08-1990	Nishi		
		4,970,546	11-1990	Suzuki et al.		
		4,974,919	12-1990	Muraki et al.		
		5,016,149	05-1991	Tanaka et al.		
		5,048,926	09-1991	Tanimoto		
		5,098,184	03-1992	van den Brandt et al.		
		5,153,773	10-1992	Muraki et al.		
		5,091,744	02-1992	Omata		
		5,153,419	10-1992	Takahashi		
		5,191,374	03-1993	Hazama et al.		
		5,237,367	08-1993	Kudo		
		5,392,094	02-1995	Kudo		
		5,673,102	09-1997	Suzuki et al.		
		RE. 34,634	06-1994	Konno et al.		

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
		JP-A-2-50417	02-1990	Japan (with abstract)		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER

DATE CONSIDERED

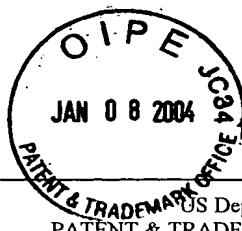
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: January 8, 2004

Sheet 4 of 9

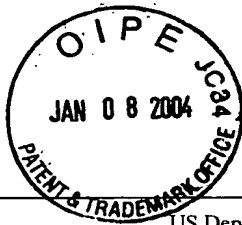
Form PTO-1449 (REV. 8-83)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 032136.09		APPLICATION NO. 10/679,151	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Naomasa SHIRAISHI			
				FILING DATE October 6, 2003		GROUP	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	
		5,208,629	05-1993	Matsuo et al.			
		5,264,898	11-1993	Kamon et al.			
		5,286,963	02-1994	Torigoe			
		5,300,971	04-1994	Kudo			
		5,305,054	04-1994	Suzuki et al.			
		5,463,497	10-1995	Muraki et al.			
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
EXAMINER					DATE CONSIDERED		
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

Date: January 8, 2004


Sheet 5 of 9

Form PTO-1449 (REV. 8-83)		U.S. Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 032136.09		APPLICATION NO. 10/679,151	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Naomasa SHIRAISHI			
				FILING DATE October 6, 2003		GROUP	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	
		3,770,340	11-1973	Cronin et al.			
		4,241,389	12-1980	Heimer			
		4,291,938	09-1981	Wagner			
		4,749,278	06-1988	Van der Werf			
		4,778,275	10-1988	Van der Brink et al.			
		4,936,665	06-1990	Whitney			
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
		Optical Engineering, vol. 12, no. 2, Mar/Apr 1973, "Dynamic Coherent Optical System", David J. Cronin et al., page 50-55					
		Optical Engineering, vol. 26, no. 4, April 1987, "Excimer laser based lithography: a deep-ultraviolet wafer stepper for VLSI processing", Victor POL et al., page 311-318					
		SPIE vol. 1264 Optical/Laser Microlithography III (1990), "Effect of central obscuration on image formation in projection lithography", S.T. Yang et al., page 477-485					
		SPIE vol. 1674 Optical/Laser Microlithography V (1992), "New imaging technique for 64M-DRAM", Naomasa SHIRAISHI et al., page 741-752					
		SPIE vol. 633 Optical Microlithography V (1986), "A concept for a high resolution Optical Lithographic System for Producing one-half Micron Linewidth", George O. Reynolds, page 228-238					
		"On the use of an illumination azimuth diaphragm during coaxial dark field illumination", A. SZEGVARI et al., 1923, page 1-11					
		Charles C. Thomas, Publisher, Springfield, IL, (1958) "The practical use of the microscope, including photomicrography", George H. Needham, chapter XX, pages 315-327; and page 97					
		W.H. Freeman and Company, Publisher, San Francisco 1958, "Concepts of classical optics", John Strong, Appendix K, "The wave theory of microscopic image formation by F. ZERNIKE, pages 525-536					
EXAMINER					DATE CONSIDERED		
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

Date: January 8, 2004



Sheet 6 of 9

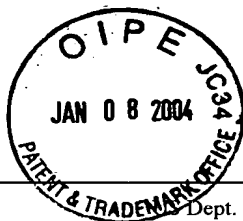
Form PTO-1449 (REV. 8-83)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 032136.09		APPLICATION NO. 10/679,151	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Naomasa SHIRAISHI			
				FILING DATE October 6, 2003		GROUP	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
		SPIE vol. 1674 Optical/Laser Microlithography V (1992), "Subhalf micron lithography system with phase-shifting effect", Miyoko NOGUCHI et al., page 92-104					
		Microelectronic Engineering 11 (1990), Elsevier Science Publishers B.V., "Heterodyne holographic nanometer alignment for a wafer stepper", N. Nomura et al., page 133-136					
		J. Vac. Sci. Technol. B 10(6), Nov/Dec 1992, "Investigation of single sideband optical lithography using oblique incidence illumination", Emi TAMECHIKA et al., page 3027-3031					
		"Resolution improvement with annular illumination" May 15, 1992, Keiichiro TOUNAI et al., 11 pages					
		IEEE 1992, "Characterization of super-resolution photolithography", H. FUKUDA et al., page 49-52					
		Jpn. J. Appl. Phys. Vol. 31 (1992), Part 1, no. 12B, December 1992, "A new pupil filter for annular illumination in optical lithography", Hiroshi FUKUDA et al., page 4126-4130					
		Elsevier, PWN - Polish Scientific Publishers, 1988, "Advanced light microscopy", vol. 1, Principles and Basic Properties, Maksymilian PLUTA, page 460-463					
		Microscope Publications, Ltd. 1974, "The optical performance of the light microscope, physical optical aspects of image formation", H. Wolfgang ZIELER, page 32-55					
		Marcel Dekker, Inc., New York, Basel, Microlithography, science and technology, (1998) Chapter 2, "Optical Lithography Modeling", Chris A. MACK, page 109-270					
		McGraw-Hill Book Company, San Francisco, Introduction to Fourier Optics, (1968) Chapter 6, "Frequency analysis of optical imaging systems, Joseph W. Goodman, page 101-197					
		Elsevier, PWN-Polish Scientific Publishers 1989, Advanced Light Microscopy, Volume 2, Specialized Methods, Maksymilian PLUTA, page 100-113					
		J. Vac. Sci. Technol. B 9(6), Nov/Dec 1991, "Improving projection lithography image illumination by using sources far from the optical axis", Satoru ASAI et al., page 2788-2791					
		North-Holland Publishing Company, 1980, Chapter 2, "Optical methods for fine line lithography", B.J. LIN, page 107-232					
EXAMINER				DATE CONSIDERED			
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

Date: January 8, 2004

Sheet 7 of 9

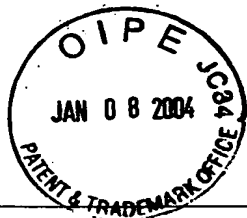
Form PTO-1449 (REV. 8-83)		U.S. Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 032136.09		APPLICATION NO. 10/679,151	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Naomasa SHIRAISHI			
				FILING DATE October 6, 2003		GROUP	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	
		3,492,635	1/70	Farr			
		3,639,039	2/72	Rhodes, Jr.			
		3,658,420	4/72	Axelrod			
		4,472,023	9/84	Yamamoto			
		4,854,669	8/89	Birnback et al.			
		4,739,373	4/88	Nishi et al.			
		5,121,160	6/92	Sano et al.			
		5,307,207	4/94	Ichihara			
		5,004,348	4/91	Magome			
		3,630,598	12/71	Little			
		5,440,426	8/95	Sandstrom			
		5,446,587	8/95	Kang et al.			
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	
		59-83165	05/84	Japan			
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
EXAMINER					DATE CONSIDERED		
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

Date: January 8, 2004

Sheet 8 of 9

Form PTO-1449 (REV. 8-83)		Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 032136.09		APPLICATION NO. 10/679,151	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Naomasa SHIRAISHI			
				FILING DATE October 6, 2003		GROUP	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	
		5,245,384	9/93	Mori			
		5,329,336	7/94	Hirano et al.			
		5,309,198	5/94	Nakagawa			
		4,207,370	6/80	Liu			
		5,638,211	6/97	Shiraishi			
		4,132,479	01-1979	Dubroeucq et al.			
		4,780,747	10-1988	Suzuki et al.			
		4,789,222	12-1988	Ota et al.			
		4,988,188	01-1991	Ohta			
		4,992,825	02-1991	Fukuda et al.			
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	
		JP-A-56-12615	02-1981	Japan (with abstract)			
		JP-A-58-16214	01-1983	Japan (with abstract)			
		JP-A-59-49514	03-1984	Japan (with abstract)			
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
EXAMINER				DATE CONSIDERED			
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

Date: January 8, 2004



Sheet 9 of 9

Form PTO-1449 (REV. 8-83)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 032136.09		APPLICATION NO. 10/679,151	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Naomasa SHIRAISHI			
				FILING DATE October 6, 2003		GROUP	

U.S. PATENT DOCUMENTS						
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
		3,776,633	12-1973	Frosch et al.		
		4,370,026	01-1983	Dubroeuq et al.		
		4,814,829	03-1989	Kosugi et al.		
		4,841,341	06-1989	Ogawa et al.		
		4,947,413	08-1990	Jewell et al.		
		5,337,097	08-1994	Suzuki et al.		
		3,729,252	04-1973	Nelson		

FOREIGN PATENT DOCUMENTS						
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS
		61-91662	05-1986	Japan (with translation)		
		61-41150	02-1986	Japan (with translation)		
		62-50811	10-1987	Japan		
		0352975	1990	EPO		
		2-48090	10-1990	Japan		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)		
		"Illuminator Modification of an Optical Aligner" by Delmer L. Fehrs et al., KTI Microelectronics Seminar, November 6-7, 1989.
		"Pattern Recognition Automatic Fine Alignment" by D.H. Berry, Proc SPIE vol. 334, pp. 10-16 (1982).
		Lens aberration measurement technique using attenuated phase-shifting mask, Akira Imai et al., Device Development Center, Hitachi Ltd., 1998.

EXAMINER	DATE CONSIDERED
Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Date: January 8, 2004